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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/516,581	03/01/2000	Eugene A DeLaRosa	M4065.0215/P215	3124

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EXAMINER

WERNER, BRIAN P

ART UNIT	PAPER NUMBER
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2621

DATE MAILED: 08/19/2003

6

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/516,581

Applicant(s)

DELAROSA ET AL.

Examiner

Brian P. Werner

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 April 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

DETAILED ACTION

Drawings

1. The drawings were received on April 27, 2000. These drawings are acceptable.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-9, 11, 13-22, 24 and 26 are rejected under 35 U.S.C. 102(e) as being anticipated by David (US 6,068,954 A).

Regarding claims 1, 2, 9, 11, 13, 14, 15, 22, 24 and 26, David discloses a method and apparatus (i.e., figures 6-8) for measuring the registration between two integrated circuit layers ("wafer" layers at column 7, line 2), on residing over the other ("ascertain whether the latent image of the alignment pattern is aligned relative to a substrate over which it is received" at column 5, line 52), comprising:

an optical imaging system ("optical scanning devices" at column 6, line 60) generating an image (figure 2) of a field of the two integrated circuit layers, each of the

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layers having a respective visible feature in the image (as depicted in figure 2, the lower layer has alignment mark 22 and the upper layer has mark 12; both marks are visible to the camera as both are picked up in the image; this overall claimed step is depicted at figure 6, numeral 32);

means for digitizing the image and processing the digitized image (the image processing module of figure 8, numeral 42, which is equivalent to the applicant's disclosed structure of an image processing module at applicant's figure 2, numeral 148) to determine a relative location of the visible feature of one layer relative to the feature of the other layer ("translational error" at column 5, line 20, as depicted in figure 4; this overall claimed step is depicted as figure 6, numeral 34); and

means for determining if the relative location is within acceptable design limits for the integrated circuit layers (again, the image processing module of figure 8, numeral 42, which is equivalent to the applicant's disclosed structure of an image processing module at applicant's figure 2, numeral 148; the inspection processor of David's numeral 42 compares the positional deviation with "desired tolerances" at column 5, line 15; this claimed step is depicted at figure 6, numeral 36).

Regarding claims 3-5 and 16-18, David anticipates the determination of "translational" errors from an image of the alignment marks as described at column 5, line 20, and as depicted in figures 4 and 5. David discloses how the relative translational misalignments between the two alignment marks are measured and compared with "desired tolerances" at column 5, line 15. The translational misalignments are with respect to the "X and Y directions" at column 3, line 44. Given

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that the David's is computer implemented with all of the processing done by the computer, then David necessarily determines the x and y image coordinates of both the upper and lower marks as called for by claims 3,4,16 and 17, and further determines their relative displacements with respect to one another (i.e., "translational error" at column 5, line 20) as called for by claims 5 and 18.

Regarding claims 6, 8, 19 and 21, David discloses acceptable design limits ("alignment tolerances" at column 4, line 11).

Regarding claims 7 and 20, David calculates an offset value (i.e., the "translational error" at column 5, line 20).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 12 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of David (US 6,068,954 A) and Worster et al. (US 5,479,252 A).

While David requires a scanner "capable of examining the alignment patterns in measuring the desired parameters" (i.e., at column 6, line 61), David does not teach a microscope and a video camera.

Worster discloses a system that captures images of a wafer, where the image scanner comprises a microscope and a video camera ("microscope" and "camera" at

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column 10, lines 4-5; figure 1, the camera is designated at numeral 219, and the microscope by the optics in front of the camera including numerals 223 and 205).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to utilize the camera/microscope of Worster as the image pickup device required by David to capture images "with an accuracy of a few microns" (Worster, column 6, line 3) without "the use of a microscope eyepieces that would result in undesirable proximity of the operator to the wafer ... that may result in contamination" (Worster, column 10, line 6).

6. Claims 10 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of David (US 6,068,954 A) and Seiler et al. (US 4,766,311 A).

While David requires a scanner "capable of examining the alignment patterns in measuring the desired parameters" (i.e., at column 6, line 61), David does not teach a scanning electron microscope.

Seiler discloses a system that captures images of wafers, where the image scanner is a scanning electron microscope ("scanning electron microscopes" at column 2, line 60).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to utilize the electron microscope of Seiler as the image pickup device required by David to capture images that are "highly precise" (Seiler, column 1, line 10).

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Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian P. Werner whose telephone number is 703-306-3037. The examiner can normally be reached on M-F, 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo H. Boudreau can be reached on 703-305-4706. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4750.

Brian Werner
Patent Examiner
Friday, August 15, 2003



BRIAN WERNER
PRIMARY EXAMINER